



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/579,141

12/28/2006

Shigemasa Suga

5376-0101PUS1

6382

2292 7590 01/11/2008
BIRCH STEWART KOLASCH & BIRCH
PO BOX 747
FALLS CHURCH, VA 22040-0747

EXAMINER

WEBB, GREGORY E

ART UNIT

PAPER NUMBER

1796

NOTIFICATION DATE

DELIVERY MODE

01/11/2008

ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

mailroom@bskb.com

Office Action Summary

Application No.

10/579,141

Applicant(s)

SUGA ET AL.

Examiner

Gregory E. Webb

Art Unit

1796

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE _____ MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on IDS 2/26/07
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-10 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-10 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- 1) ☒ Certified copies of the priority documents have been received.
- 2) ☐ Certified copies of the priority documents have been received in Application No. _____.
- 3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

[Signature]
1/7/08

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000.

Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

2. Claims 1-10 are rejected under 35 U.S.C. 102(e) as being anticipated by Morinaga (US 6,896,744).

Concerning the phosphoric acid, Morinaga teaches the following:

An amine such as ethylenediamine, 8-quinolinol or o-phenanthroline; a carboxylic acid such as formic acid, acetic acid, oxalic acid or tartaric acid; a hydrogen halide such as hydrofluoric acid, hydrochloric acid, hydrogen bromide or hydrogen iodide, or salts thereof; an oxo acid such as **phosphoric acid** or condensed **phosphoric acid**, or salts thereof. (*emphasis added*)

Concerning the hydrofluoric acid, Morinaga teaches the following:

In order to control such etching of SiO₂, a cleaning method is also proposed wherein, although the cleaning time is the same as before, the **hydrofluoric acid** concentration is extremely reduced, and for example, the substrate surface is cleaned with an extremely dilute hydrochloric acid aqueous solution having a very small amount at a level of e.g. 10 wt ppm of **hydrofluoric acid** added to pure water (JP-A-3-190130, etc.). However, by such a cleaning method, since the **hydrofluoric acid** concentration is extremely low, it requires about 5 minutes for only cleaning with this **hydrofluoric acid** aqueous solution, whereby the production efficiency is still low. In addition, in a case where this method is applied to a sheet cleaning apparatus, a large amount of the cleaning agent will be required, and accordingly a large amount of an acid waste liquid will be formed, and its disposal will be problematic. (*emphasis added*)

Concerning the ammonia/amine, Morinaga teaches the following:

The alkaline cleaning agent to be used in the present invention is an aqueous alkaline solution containing an alkaline component and having a pH value exceeding 7. The alkaline component in the solution is not particularly limited, but, as typical ones, **ammonium hydroxide** (an aqueous **ammonia** solution) and an organic alkali may be mentioned. As the organic alkali, a quaternary

ammonium hydroxide, or an amine such as amine or amino alcohol, may be mentioned. As the quaternary **ammonium hydroxide**, one having an alkyl group having from 1 to 4 carbon atoms and/or a hydroxyalkyl group, is preferred. As the alkyl group, an alkyl group having from 1 to 10 carbon atoms, such as a methyl group, an ethyl group, a propyl group or a butyl group, may be mentioned. As the hydroxyalkyl group, a hydroxyalkyl group having from 1 to 10 carbon atoms, such as hydroxymethyl, hydroxyethyl, hydroxypropyl or hydroxybutyl, may be mentioned. As such a quaternary **ammonium hydroxide**, tetramethyl**ammonium hydroxide** (TMAH), tetraethyl**ammonium hydroxide**, trimethyl(hydroxyethyl)**ammonium hydroxide** (so-called choline) or triethyl(hydroxyethyl)**ammonium hydroxide** may, for example, be specifically mentioned. As other amines, ethylenediamine, monoethanolamine, trimethanolamine, etc., may be mentioned. (*emphasis added*)

Concerning the chelate agent, Morinaga teaches the following:

Among the above-mentioned complexing agents, from such reasons as the cleaning effects, chemical stability, etc., a nitrogen-containing carboxylic acid such as ethylenediamine tetracetic acid (EDTA) or diethylenetriamine pentacetic acid (DTPA); a nitrogen-containing phosphonic acid such as nitrilotris(methylenephosphonic acid) (NTPO), ethylenediaminetetrakis(methylenephosphonic acid) (EDTPO) or propylenediaminetetra(methylenephosphonic acid) (PDTMP); ethylenediamine di-o-hydroxyphenyl acetic acid (EDDHA) and its derivatives; and N,N'-bis(2-hydroxybenzyl)ethylenediamine-N,N'-diacetic acid (HBED) are, for example, preferred. (*emphasis added*)

Concerning the hydrogen peroxide, Morinaga teaches the following:

To the alkaline cleaning agent to be used in the present invention, an oxidizing agent such as **hydrogen peroxide**, ozone or oxygen, may optionally be incorporated. In a case where in a process for cleaning a semiconductor device substrate, the surface of a bare silicon substrate (a silicon substrate having no

oxide film) is to be cleaned, it is possible to control etching or surface roughing of the substrate by incorporating an oxidizing agent. When **hydrogen peroxide** is to be incorporated to the alkaline cleaning agent to be used in the present invention, it is usually employed so that the concentration of **hydrogen peroxide** in the entire liquid of the cleaning agent will be within a concentration range of from 0.001 to 5 wt %, preferably from 0.01 to 1 wt %. (*emphasis added*)

3. Claims 1-10 are rejected under 35 U.S.C. 102(b) as being anticipated by Nohara (US6686322).

Concerning the phosphoric acid, Nohara teaches the following:

Still further examples of the chelating agent include condensed **phosphoric acids** such as **metaphosphoric acid**, **tetrametaphosphoric acid**, **hexametaphosphoric acid** and **tripolyphosphoric acid**; and ammonium salts, metal salts and organic amine salts of the condensed **phosphoric acids**. (*emphasis added*)

Concerning the hydrofluoric acid, Nohara teaches the following:

As the cleaning agent for glass substrates for liquid crystals, alkali cleaning agents such as inorganic alkalis and organic alkalis and acid cleaning agents such as sulfuric acid, **hydrofluoric acid** and buffered **hydrofluoric acid** are currently used. However, the cleaning agents using inorganic alkalis have a problem in that alkali ions are adsorbed to the substrates and remain there after the cleaning and the residual alkali ions occasionally cause problems on electric properties of the substrates, in particular, the substrates of thin film transistors (TFT). The cleaning agents using organic alkalis have a problem in that a sufficient effect of cleaning cannot be obtained and adhesion of thin films formed in the succeeding steps occasionally becomes poor. Moreover, when the cleaning is conducted using a conventional cleaning agent, minute roughness of the surface of glass substrates as damages formed by the etching and minute

particles also formed by the etching are not completely removed. These problems are becoming crucial as the liquid crystals are more highly integrated and the surface area of the glass substrates increases. It is strongly desired that an effective method to overcome these problems is developed. (*emphasis added*)

Concerning the ammonia, Nohara teaches the following:

pH of the cleaning agent of the present invention is not particularly limited. In general, the cleaning agent is used at a pH in the range of 3 to 12. pH can be suitably selected in accordance with the etching conditions and the type of the used inorganic substrate. When the cleaning agent is used in an alkaline condition, **ammonia**, an amine or a quaternary **ammonium hydroxide** such as tetramethyl**ammonium hydroxide** may be added. When the cleaning agent is used in an acidic condition, an organic acid or an inorganic acid may be added. (*emphasis added*)

Concerning the chelate agent, Nohara teaches the following:

Any of the above **chelating** agents may be used as the **chelating** agent. The **chelating** agents of phosphonic acids which have two or more phosphonic groups in the molecule are preferable and **chelating** agents of phosphonic acids which have 2 to 6 phosphonic acid groups in the molecule are more preferable. Specifically, 1,2-propanediaminetetramethylenephosphonic acid, diethylenetriaminepentamethylenephosphonic acid and ethylenediaminetetrakisethylenephosphonic acid are preferable and 1,2-propanediaminetetramethylenephosphonic acid is more preferable. (*emphasis added*)

Concerning the hydrogen peroxide, Nohara teaches the following:

Examples of the oxidizing agent include inorganic peroxides such as **hydrogen peroxide**, ozone and perchloric acid and organic peroxides such as benzoyl peroxide. Among these oxidizing agents, inorganic peroxides are preferable and **hydrogen peroxide** is more preferable. The oxidizing agent may also be used

as a solution in an organic solvent. The concentration of the oxidizing agent used in the present invention is 0.1 to 60% by weight and preferably 0.5 to 30% by weight of the entire cleaning agent. When the concentration is smaller than 0.1% by weight, the desired cleaning effect cannot be obtained. When the concentration exceeds 60% by weight, there is the possibility that wiring materials such as conductive thin film materials are corroded. (*emphasis added*)

4. Claims 1-10 are rejected under 35 U.S.C. 102(b) as being anticipated by Sakon (US5560857).

Concerning the phosphoric acid and the ammonia, Sakon teaches the following:

3. The solution according to claim 2, wherein said acid is selected from the group consisting of **phosphoric acid**, sulfuric acid, nitric acid, trichloroacetic acid, dichloroacetic acid, hydrochloric acid, monochloroacetic acid and acetic acid, and said salt is selected from the group consisting of ammonium salts and amine salts, and the base is selected from the group consisting of **ammonia** and amines. (*emphasis added*)

Concerning the hydrofluoric acid, Sakon teaches the following:

The results of the Comparative Examples where the cleaning solution differs from those of the present invention in the concentration of **hydrogen fluoride**, the concentration of hydrogen peroxide, and the level of pH as well as having no **hydrogen fluoride**, were used to effect cleaning, followed by rinsing, are also given in Table 1 (Numbers 48 to 62). (*emphasis added*)

Concerning the hydrogen peroxide, Sakon teaches the following:

Comparative Example 50 indicates that the characteristics of the cleaning solution of the present invention may be retained even at a content of **hydrogen peroxide** in excess of 20% by weight. However, such high content of **hydrogen peroxide** is not only disadvantageous in cost, but also undesirable from a safety viewpoint because of evolution of oxygen gas through decomposition of **hydrogen peroxide**. (*emphasis added*)

5. Claims 1-10 are rejected under 35 U.S.C. 102(b) as being anticipated by Verhaverbeke (US5972123).

Concerning the phosphoric acid, hydrofluoric acid, ammonia and the hydrogen peroxide, Verhaverbeke teaches the following:

The reactive chemical process liquids suitable for practicing the invention include, without limitation, aqueous solutions of hydrochloric acid and buffers comprising the same, **ammonium hydroxide** and buffers comprising the same, **hydrogen peroxide**, sulfuric acid and buffers comprising the same, mixtures of sulfuric acid and ozone, **hydrofluoric acid** and buffers comprising the same, chromic acid and buffers comprising the same, **phosphoric acid** and buffers comprising the same, acetic acid and buffers comprising the same, nitric acid and buffers comprising the same, ammonium fluoride buffered **hydrofluoric acid**, **ammonium hydroxide** and buffers comprising the same, and **hydrofluoric acid** and buffers comprising the same, and combinations thereof. BHF can be used at anytime during a wet processing technique. The particular process liquids used, the equipment used, the exposure time, and the experimental conditions (i.e., temperature, concentration, and flow of the process liquid) will vary depending on the particular purpose of the particular wet processing methodology. (*emphasis added*)

Concerning the chelate agent, Verhaverbeke teaches the following:

The reactive chemical process liquids may further contain additional additives such as surfactants, complexing or **chelating** agents, and corrosion inhibitors. (*emphasis added*)

Conclusion

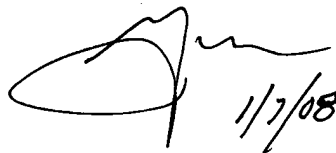
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Gregory E. Webb whose telephone number is 571-272-1325. The examiner can normally be reached on 9:00-17:30 (m-f).

Application/Control Number:
10/579,141
Art Unit: 1796

Page 9

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Harold Pyon can be reached on 571-272-1498. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Gregory E. Webb
Primary Examiner
Art Unit 1796

gew